Amendments to the Claims:

Please add claims 1-6 to this application, as shown below.

1. (NEW) A system for detecting atmospheric dust comprising:

A means for collecting multispectral optical-spectrum imagery having at least a first, second, third fourth, fifth, sixth and seventh channel wherein each channel relates to a unique wavelength,

a processor operatively coupled to the collection means, wherein the processor receives the multispectrial optical-spectrum imagery and processes the digital data by:

performing a numerical atmospheric correction for removal of molecular scatter within all of the visible-spectrum channels, based on radiative transfer calculations stored in pre-computed look-up tables and indexed as a function of solar and sensor geometry,

determining the pixel background for each pixel of the image by combining known earth location with a terrestrial database,

employing a background-dependent algorithm to compute the dust enhancement variable ***D***,

means for displaying the multispectrial imagery coupled to the processor, wherein the means for displaying the multispectrial imagery comprises a red, blue and green color gun for displaying the visible light spectrum via a hue/saturation decomposed color technique,

creating a false color composite by loading the background-dependent ***D*** variable into the red color gun, loading log-scaled percent-reflectance (and subsequently byte-scaled between [0,255] for values falling within [-1.45, 0.0]) into the blue and green color guns of said composite, wherein the resultant imagery rendered depicts atmospheric dust as visually enhanced in red/pink tonalities.

2. (NEW) The system of claim 1 whereby when a pixel is determined to have a ***water*** background, $\boldsymbol{D}=\boldsymbol{D}_{\mathrm{wat}}$ and the processor calculates the log-scaled normalized difference ($\boldsymbol{D}_{\mathrm{wat}}$) between the channel 2 and 3 reflectivites according to the relation:

$$\boldsymbol{D}_{\mathrm{wat}} = \log_{10}\left(\frac{R_2 - R_3}{R_2 + R_3}\right),$$

byte-scaling this quantity over the range [-0.40, 0.15], where the bidirectional reflection function ($R_k \in [0, 1]$) at channel (k) is expressed in terms of channel radiance (I_k) as:

$$R_k = \frac{\pi I_k}{\mu_o F_{o,k}}$$

and μ_o and $F_{o,k}$ are the cosine of the solar zenith angle and band-weighted solar spectral flux, respectively,

3. (NEW) The system of claim 1 whereby when a pixel is determined to have a ***land*** background, $\boldsymbol{D}$=$\boldsymbol{D}_{lnd}$ and the processor calculates the multivariate quantity ($\boldsymbol{D}_{lnd}$) according to the relation:

$$\boldsymbol{D}_{lnd} = L1 + L3 - L4 + (1.0 - L2)$$

byte-scaled over the range [1.3, 2.7], where:

L1 = T(7) - T(6), byte-scaled over the range [-2,2]
L2 = T(6), byte-scaled over the range [T_{dyn},T_{max}(6)]
L3 = 2R(1) - R(3) - R(4) -1.2, byte-scaled over the range [-1.5,0.25]
L4 = R(5) > 0.05 ? 0, else 1, (no byte-scaling applied)

Where T(x) are brightness temperatures as measured at channel (x), and the dynamic temperature range (T_{dyn}(6),T_{max}(6)) used in the L2 term byte-scaling is defined by:

$$T_{dyn}(6) = \begin{cases} T_{\max}(6) - 21 & if\left(T_{\max}(6) < 301K\right) \\ \left(T_{\max}(6) - 273\right)/4 + 273 & otherwise, \end{cases}$$

and T_{max}(6) is the maximum temperature detected (in kelvins) at a channel 6 for the current scene.

4. (NEW) The system of claim 2 wherein channel 1 has a central wavelength of approximately 0.645 μm, channel 2 has a central wavelength of approximately 0.853 μm, channel 3 has a central wavelength of approximately 0.469 μm, and channel 4 has a central wavelength of approximately 0.555 μm.

5. (NEW) The system of claim 3 wherein channel 1 has a central wavelength of approximately 0.645 μm, channel 2 has a central wavelength of approximately 0.853 μm, channel 3 has a central wavelength of approximately 0.469 μm, and channel 4 has a central wavelength of approximately 0.555 μm, channel 5 has a central wavelength of approximately 1.38 μm, channel 6 has a central wavelength of approximately 11.0 μm, and channel 7 has a central wavelength of approximately 12.0 μm.

6. (NEW) A system for detecting atmospheric dust comprising:

means for collecting multispectral optical-spectrum imagery having at least a first, second, third fourth, fifth, sixth and seventh channel wherein each channel relates to a unique wavelength,

a processor operatively coupled to the collection means, wherein the processor receives the multispectrial optical-spectrum imagery and processes the digital data by:

performing a numerical atmospheric correction for removal of molecular scatter within all of the visible-spectrum channels, based on radiative transfer calculations stored in pre-computed look-up tables and indexed as a function of solar and sensor geometry,

determining the pixel background for each pixel of the image by combining known earth location with a terrestrial database,

employing a background-dependent algorithm to compute the dust enhancement variable ***D***,

wherein when a pixel is determined to have a ***water*** background, $\boldsymbol{D}=\boldsymbol{D}_{\mathrm{wat}}$ and the processor calculates the log-scaled normalized difference ($\boldsymbol{D}_{\mathrm{wat}}$) between the channel 2 and 3 reflectivites according to the relation:

$$\boldsymbol{D}_{\mathrm{wat}} = \log_{10}\left(\frac{R_2 - R_3}{R_2 + R_3}\right),$$

byte-scaling this quantity over the range [-0.40, 0.15], where the bidirectional reflection function ($R_k \in [0, 1]$) at channel (k) is expressed in terms of channel radiance (I_k) as:

$$R_k = \frac{\pi I_k}{\mu_o F_{o,k}}$$

and μ_o and $F_{o,k}$ are the cosine of the solar zenith angle and band-weighted solar spectral flux, respectively,

wherein when a pixel is determined to have a ***land*** background, $\boldsymbol{D}=\boldsymbol{D}_{\mathrm{lnd}}$ and the processor calculates the multivariate quantity ($\boldsymbol{D}_{\mathrm{lnd}}$) according to the relation:

$$\boldsymbol{D}_{\mathrm{lnd}} = L1 + L3 - L4 + (1.0 - L2)$$

byte-scaled over the range [1.3, 2.7], where:

L1 = T(7) - T(6), byte-scaled over the range [-2,2]
L2 = T(6), byte-scaled over the range [T_{dyn},T_{max}(6)]
L3 = 2R(1) - R(3) - R(4) -1.2, byte-scaled over the range [-1.5,0.25]
L4 = R(5) > 0.05 ? 0, else 1, (no byte-scaling applied)

where T(x) are brightness temperatures as measured at channel (x), and the dynamic temperature range ($T_{dyn}(6)$,$T_{max}(6)$) used in the L2 term byte-scaling is defined by:

$$T_{dyn}(6) = \begin{cases} T_{max}(6) - 21 & if(T_{max}(6) < 301K) \\ (T_{max}(6) - 273)/4 + 273 & otherwise, \end{cases}$$

and $T_{max}(6)$ is the maximum temperature detected (in kelvins) at a channel 6 for the current scene.

7. (NEW) A system for detecting atmospheric dust comprising:

means for collecting multispectral optical-spectrum imagery having at least a first, second, third fourth, fifth, sixth and seventh channel wherein each channel relates to a unique wavelength,

a processor operatively coupled to the collection means, wherein the processor receives the multispectrial optical-spectrum imagery and processes the digital data by:

performing a numerical atmospheric correction for removal of molecular scatter within all of the visible-spectrum channels, based on radiative transfer calculations stored in pre-computed look-up tables and indexed as a function of solar and sensor geometry,

determining the pixel background for each pixel of the image by combining known earth location with a terrestrial database,

employing a background-dependent algorithm to compute the dust enhancement variable ***D***,

wherein when a pixel is determined to have a ***water*** background, $\boldsymbol{D}=\boldsymbol{D}_{wat}$ and the processor calculates the log-scaled normalized difference ($\boldsymbol{D}_{wat}$) between the channel 2 and 3 reflectivites according to the relation:

$$\boldsymbol{D}_{wat} = \log_{10}\left(\frac{R_2 - R_3}{R_2 + R_3}\right),$$

byte-scaling this quantity over the range [-0.40, 0.15], where the bidirectional reflection function ($R_k \in [0, 1]$) at channel (k) is expressed in terms of channel radiance (I_k) as:

$$R_k = \frac{\pi I_k}{\mu_o F_{o,k}}$$

and μ_o and $F_{o,k}$ are the cosine of the solar zenith angle and band-weighted solar spectral flux, respectively,

wherein when a pixel is determined to have a ***land*** background, $\boldsymbol{D}=\boldsymbol{D}_{lnd}$ and the processor calculates the multivariate quantity ($\boldsymbol{D}_{lnd}$) according to the relation:

$$\boldsymbol{D}_{lnd} = L1 + L3 - L4 + (1.0 - L2)$$

byte-scaled over the range [1.3, 2.7], where:

L1 = T(7) - T(6), byte-scaled over the range [-2,2]
L2 = T(6), byte-scaled over the range [T_{dyn},T_{max}(6)]
L3 = 2R(1) - R(3) - R(4) -1.2, byte-scaled over the range [-1.5,0.25]
L4 = R(5) > 0.05 ? 0, else 1, (no byte-scaling applied)

where T(x) are brightness temperatures as measured at channel (x), and the dynamic temperature range (T_{dyn}(6),T_{max}(6)) used in the L2 term byte-scaling is defined by:

$$T_{dyn}(6) = \begin{cases} T_{max}(6) - 21 & if(T_{max}(6) < 301K) \\ (T_{max}(6) - 273)/4 + 273 & otherwise, \end{cases}$$

and T_{max}(6) is the maximum temperature detected (in kelvins) at a channel 6 for the current scene,

means for displaying the multispectrial imagery coupled to the processor, wherein the means for displaying the multispectrial imagery comprises a red, blue and green color gun for displaying the visible light spectrum via a hue/saturation decomposed color technique,

creating a false color composite by loading the background-dependent ***D*** variable into the red color gun, loading log-scaled percent-reflectance (and subsequently byte-scaled between [0,255] for values falling within [-1.45, 0.0]) into the blue and green color guns of said composite, wherein the resultant imagery rendered depicts atmospheric dust as visually enhanced features.